

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the following remarks.

Claim Status

Claims 1, 3-8, and 10-22 are pending in this application.

§103 Rejection over Cho, Kozumoto and Anderson

Claims 1, 3-8 and 10-22 are rejected as being obvious under 35 U.S.C. 103(a) over Cho (6,616,841) in view of Kuzumoto (4,623,460) or alternatively over Kuzumoto in view of Cho, and over Anderson (US Patent App. No. 2003/0154856) in view of Cho or alternatively over Cho in view of Anderson. Applicant respectfully disagrees.

Applicant contends that the combinations of Cho with Kuzumoto and/or Cho with Anderson do not teach or suggest all the claim elements of the instant application.

MPEP § 2143 "Basic Requirements of a *Prima Facie* Case of Obviousness" states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine references teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all claim limitations.

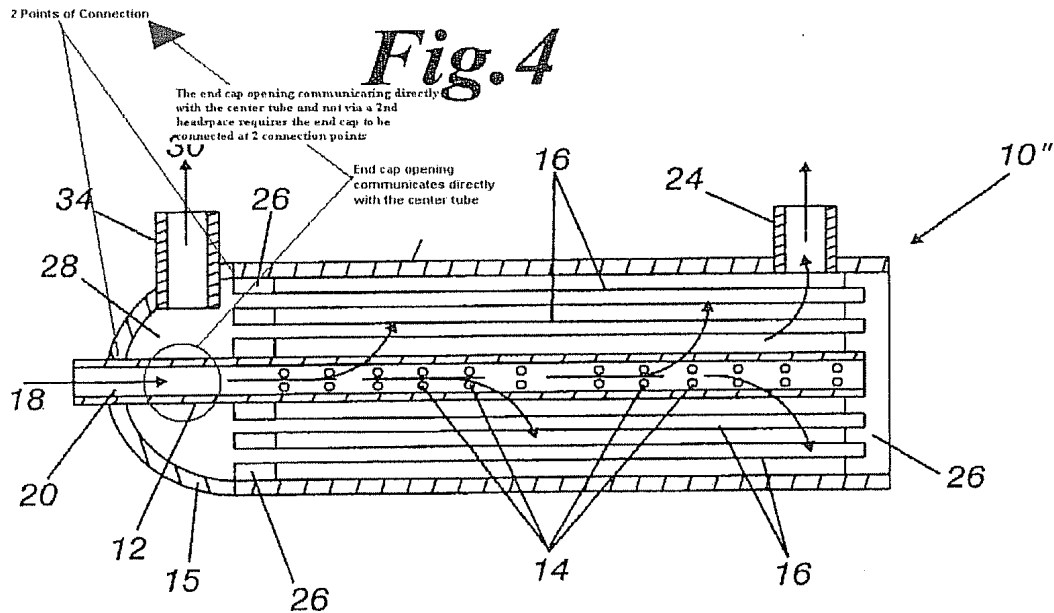
Regarding the third criterion, the court has stated that "to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

Applicant contends that none of the prior art references, Cho, Kuzumoto, nor Anderson, alone or in combination, teach or suggest all of the claim elements. More specifically, applicant contends that none of the prior art references, alone or in combination, teach or suggest a membrane contactor comprising, among other things, where "said second end cap being adjoined to said second end of said shell where said second end cap and said second tube sheet defining a second head space therebetween; said second end cap opening being in communication with said center tube **via said second head space.**"

In other words, none of the prior art references teach or suggest providing a membrane contactor that has a head space defined by an end cap and a tube sheet that allows the opening in the end cap to communicate with the center tube **via the headspace.** Accordingly, at issue is whether the prior art references teach or suggest an end cap that communicates with the center tube **via a headspace.** As shown below, the prior art references teach end caps that communicate directly with the center tube and not **via a**

headspace, thus, requiring two points of connection and a dual welding step.

Cho, as shown in Figure 4 (see the below Figure), teaches a membrane contactor with only one end cap (15). End cap (15) has two openings, opening (20) and opening (34) (please note that all end caps taught by Cho have two openings). Liquid enters center tube (12) directly through opening (20). Column 4, Lines 52-53. As a result, end cap (15) must be connected at two connection points, the shell (13) and center tube (12). These two connection points require a dual welding step (see Sengupta Declaration). This dual welding step is required in order to provide a vacuum on the open ends via headspace (28). Column 4, Lines 48-50. See below a marked-up Figure 4 of Cho that illustrates how the end caps of Cho communicate directly with the center tube and not **via a headspace**, thus, requiring the end caps to be connected to the module at two connection points.



As a result, Cho does not teach or suggest a headspace defined by the end cap and the tube sheet that allows the opening of the end cap to communicate with the center tube **via the headspace**.

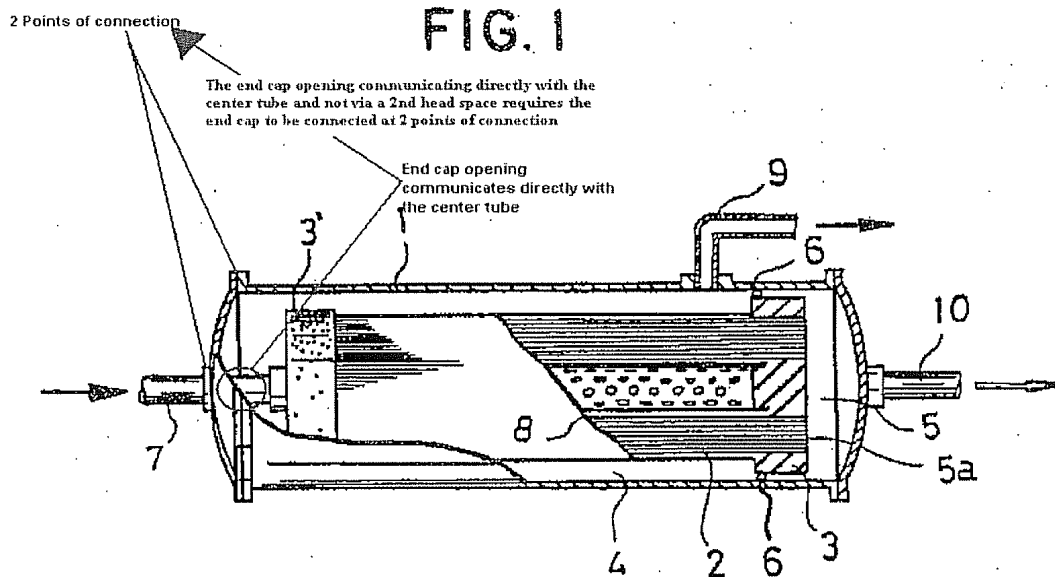
With regard to Cho, the Examiner stated in the latest office action, that:

[t]he core is plugged on one end by the tube sheet (26), but is not the same end as claimed, which eliminates the "first" end cap in the reference figure 4. However, this difference in the claims is only an obvious equivalent of the teaching of the reference unless the applicant can show otherwise, with evidence. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. Page 2, Lines 17-22.

Thus, the Examiner is stating that adding a second end cap to the right side of Cho would be within one skilled of the art. However, if Cho were to add another end cap to the other end, there is no

suggestion or teaching that the opening in the end cap should communicate with the center tube **via a headspace**. Thus, the Examiner has not addressed adding an end cap that defines a headspace between the end cap and the tube sheet that allows the opening of the end cap to communicate with the center tube **via the headspace**, as required by the instant invention. Therefore, the suggestion by the Examiner is not a mere reversal of parts, as the Examiner has asserted.

Kuzumoto, as shown in Figure 1 (see the below Figure), teaches a device with an end cap at each end of the device. At the end of the apparatus that communicates with the center pipe (8), an end cap is provided that has an inlet pipe (7). The opening through the end cap, or inlet pipe (7), communicates directly with the center pipe (8). Column 1, Lines 49-50. As a result, the end cap must be attached to the apparatus at two connection points, the end of casing (1) and the center pipe (8). These two connection points require a dual welding step (see Sengupta Declaration). See below a marked-up Figure 1 of Kuzumoto that illustrates how the end cap of Kuzumoto communicates directly with the center tube and not **via a headspace**, thus, requiring the end caps to be connected to the module at two connection points.



As a result, the apparatus of Kuzumoto does not provide a headspace defined by the end cap and the tube sheet that allows the opening through the end cap to communicate with the center tube **via the headspace**.

Furthermore, the resin layer (3) of Kuzumoto is not sealed to the casing (1), as in the instant application. This fact makes it impossible for Kuzumoto to provide a headspace defined by the end cap and the resin layer (3). Therefore, Kuzumoto can not teach or suggest a membrane contactor comprising, among other things, where "said second end cap being adjoined to said second end of said shell where said second end cap and said second tube sheet defining a second head space therebetween; said second end cap opening being

in communication with said center tube **via said second head space.**"

Anderson teaches a gas separation device adapted for removing contaminants from a feed gas mixture. The device of Anderson, as shown in Figure 3 (see the below Figure), includes end caps (6 and 7) at each end of the module (30). At the end of the module (30) that communicates with the hollow central tube (37), end cap (7) is provided which has an exit port (15). The opening through the end cap, or exit port (15), communicates directly with the hollow central tube (37). Paragraph 25, Lines 19-22. Consequently, the end cap (7) must be attached to the module (30) at two connection points, the sides of shell (5) (for clarification, see Figures 1 and 2) and the hollow central tube (37). These two connection points require a dual welding step (see Sengupta Declaration). See below a marked-up Figure 3 of Anderson that illustrates how the end caps of Anderson communicate directly with the center tube and not **via a headspace**, thus, requiring the end caps to be connected to the module at two connection points.

claim limitations, i.e., a headspace defined by an end cap and the a tube sheet that allows the opening of the end cap to communicate with the center tube **via the headspace**.

Where is the suggestion for providing this configuration of a membrane contactor? The answer, as shown above, is nowhere in the prior art. The answer can only be found in the instant application. Therefore, the Examiner has failed to present a *prima facie* case of obviousness and is merely using impermissible hindsight reconstruction.

In addition, this configuration of a membrane contactor with a headspace defined by the end cap and the tube sheet that allows the opening of the end cap to communicate with the center tube **via the headspace**, is not obvious because it unexpectedly resulted in allowing the membrane contactor to be made more easily. See the previously submitted 132 Declaration by one of the named inventors, Amitava Sengupta. The Sengupta Declaration shows that the instant configuration of a membrane contactor eliminates the need to dual weld the end cap at two connection points, the shell and the center tube. See the figures above which show that all of the prior art references require a dual welding step at two connection points, the shell and the center tube. On the other hand, the second end cap of the instant invention, by providing the second headspace

that allows the end cap to communicate with the center tube via the headspace, only has to be attached and sealed at one connection point, the end of the shell. As a result, the instant invention does not require a dual welding step.

Thus, the Sengupta Declaration shows that the instant configuration provided an unexpected result by allowing the membrane contactor to be made without the need to simultaneously dual weld (as required by the prior art, see illustrations above) the end caps at two connection points, the shell and center tube, meaning, the membrane contactor can be made more easily.

Objective evidence, or secondary considerations of obviousness, like an unexpected result or a long felt need, must be weighed in determining obviousness. MPEP § 2141. In addition, the ultimate determination on patentability is made on the entire record, meaning, the secondary considerations of obviousness should be considered in view of any amendments. MPEP § 2141. Thus, in the instant invention, the Sengupta Declaration must be weighed against the current amendments in making a final determination of obviousness.

The Examiner did not address the Sengupta Declaration in the latest office action. Thus, contrary to the MPEP and the case law,

the Examiner has failed to weigh the Sengupta Declaration against the latest claims.

Therefore, in view of the remarks above and the evidence of record, the 35 USC § 103(a) rejections must be removed and claims 1, 3-8 and 10-22 should be allowed.

Conclusion

In view of the foregoing, Applicant respectfully requests an early Notice of Allowance in this application.

Respectfully submitted,



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